PROPERTIES OF CEMENT SAND BRICK CONTAINING GROUND PALM OIL FUEL ASH(POFA) AS PARTIAL SAND REPLACEMENT

MUHAMMAD AZREEN BIN IBRAHIM

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ABSTRAK

Bata campuran simen dan pasir adalah sejenis bata dibuat daripada campuran simen dan pasir. Disebabkan oleh pertumbuhan industri pembinaan di Malaysia, permintaan terhadap bahan binaan seperti pasir telah meningkat. penggunaan pasir yang tidak terkawal akan membawa kepada peningkatan aktiviti perlombongan pasir sungai yang boleh menyebabkan ketidakseimbangan ekologi seperti kemusnahan flora dan fauna, hakisan tebing sungai dan pencemaran air. Abu bahan bakar kelapa sawit (POFA) adalah sisa pepejal sekam kelapa sawit terhasil dari pembakaran semasa proses minyak sawit. Kebiasaanya abu ini dibuang di tapak pelupusan atau kilang-kilang. Dengan menggantikan pasir dengan POFA, perlombongan pasir dan masalah pelupusan sampah dapat dikurangkan serta harga bata campuran simen dikurangkan. Kajian ini bertujuan untuk mengkaji kesan POFA kisar sebagai pengganti separa pasir dan sifat-sifat bata campuran simen pasir. Bidang kajian juga meliputi parameter penting termasuk kekuatan mampatan, kekuatan lenturan, dan penyerapan air dalam menentukan sifat-sifat kejuruteraan. Semua spesimen tertakluk kepada pengawetan udara. Ujian kekuatan mampatan dan lenturan akan dijalankan pada 7, 14, 28 dan 60 hari. Ujian penyerapan air adalah 28 hari selepas bata menjalani proses pengawetan. Berdasarkan keputusan, kekuatan mampatan dan lenturan bata mempamerkan trend yang sama. Ia menunjukkan bahawa bata campuran simen dan pasir yang mengandungi 15% daripada POFA penggantian memberikan hasil yang terbaik dari segi kekuatan mampatan dan kekuatan lenturan. Kekuatan mula meningkat pada 5% penggantian POFA sehingga ia mencapai kekuatan yang tinggi pada 15%. Kemudian ia mula berkurangan apabila penggantian POFA pada 20%. Simen bata pasir yang mengandungi 15% POFA mempamekan penyerapan air yang paling rendah.

ABSTRACT

Cement sand brick is a type of brick made from a mixture of cement and sand. Due to growth of construction industry in Malaysia, demand toward construction material such as sand will increase. Uncontrollable usage of sand will lead to increase in river sand mining activity that can cause ecological imbalance such as destruction of flora and fauna, river bank erosion and water pollution. Palm Oil Fuel Ash (POFA) is a solid waste from burning palm oil husk and palm oil shell in the boiler of palm oil mill that is usually dumped at landfill. By replacing sand with POFA, sand mining and waste disposal problems can be reduced as well as economical cement sand brick can be produce. This research aims to investigate the effect of ground POFA as partial sand replacement on the properties of cement sand brick. The field of studies also covers important parameters including compressive strength, flexural strength, and water absorption in determining the engineering properties. All the specimen were subjected to air curing. The compressive and flexural strength tests have been conducted on 7, 14, 28 and 60 days. Water absorption were conducted at the age 28 days. Based on result, the compressive and flexural strength of the brick exhibit the same trend. Finding shows that cement sand brick containing 15% of ground POFA replacement give the best results in terms of highest compressive strength and flexural strength. The strength started to increase strength at 5% of POFA replacement until it achieve highest strength at 15%. Then it start to decrease when POFA replacement at 20%. Cement sand brick containing 15% POFA exhibit the lowest water absorption